WATER VULNERABILITY ASSESSMENTS & EMERGENCY RESPONSE PLANNING

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PUBLIC HEALTH SECURITY & BIOTERRORISM PREPAREDNESS ACT

- Assess vulnerability of potable water system infrastructure
- Ensure adequate planning, resources & training
- Provide for response

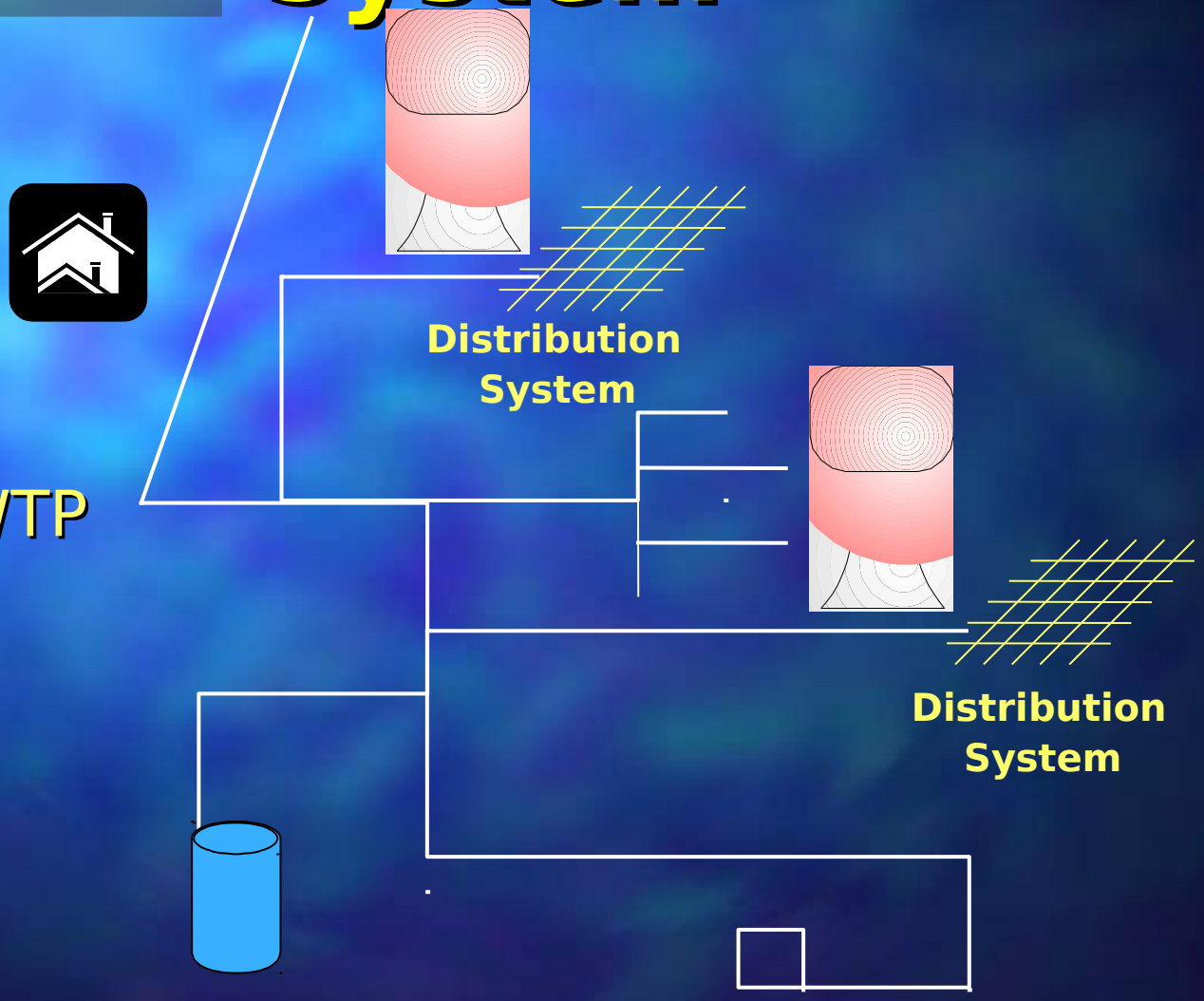
VULNERABILITY ANALYSIS

- Characterize the water system
- ID & Prioritize adverse consequences to avoid
- Determine critical assets

VULNERABILITY ANALYSIS

- Assess likelihood of malevolent acts
- Evaluate existing countermeasures
- Develop risk reduction plan

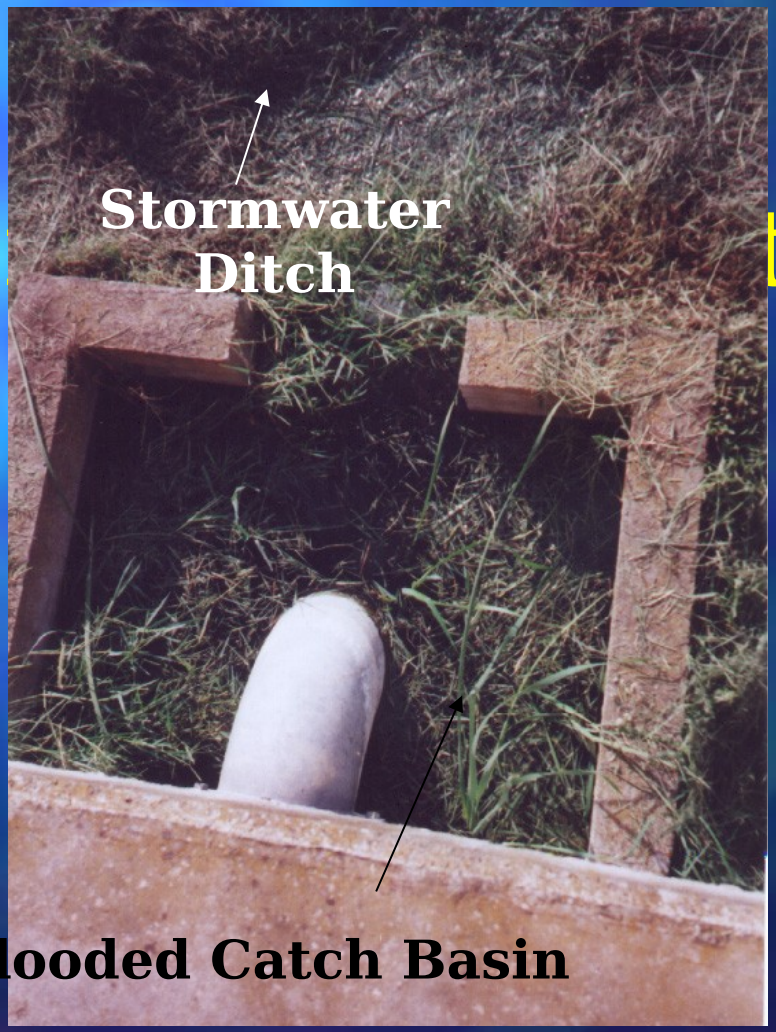
Characterize Water System



Rodent Nest in Well

Evidence of Poor Chemical Usage Practice

Tank Submerged Overflow



Hypochlorite Bulk Tanks

Polyethylene Deterioration

Storage Maintenance

Typical Problems With Stored Water

- Bacterial Regrowth
- Maintenance of Disinfectant Residual
- Degradation of Tank Coating, Materials, and Appurtenances
- Nitrification
- Accumulation of Debris/Sediment
- DBP Formation

ADVERSE CONSEQUENCES

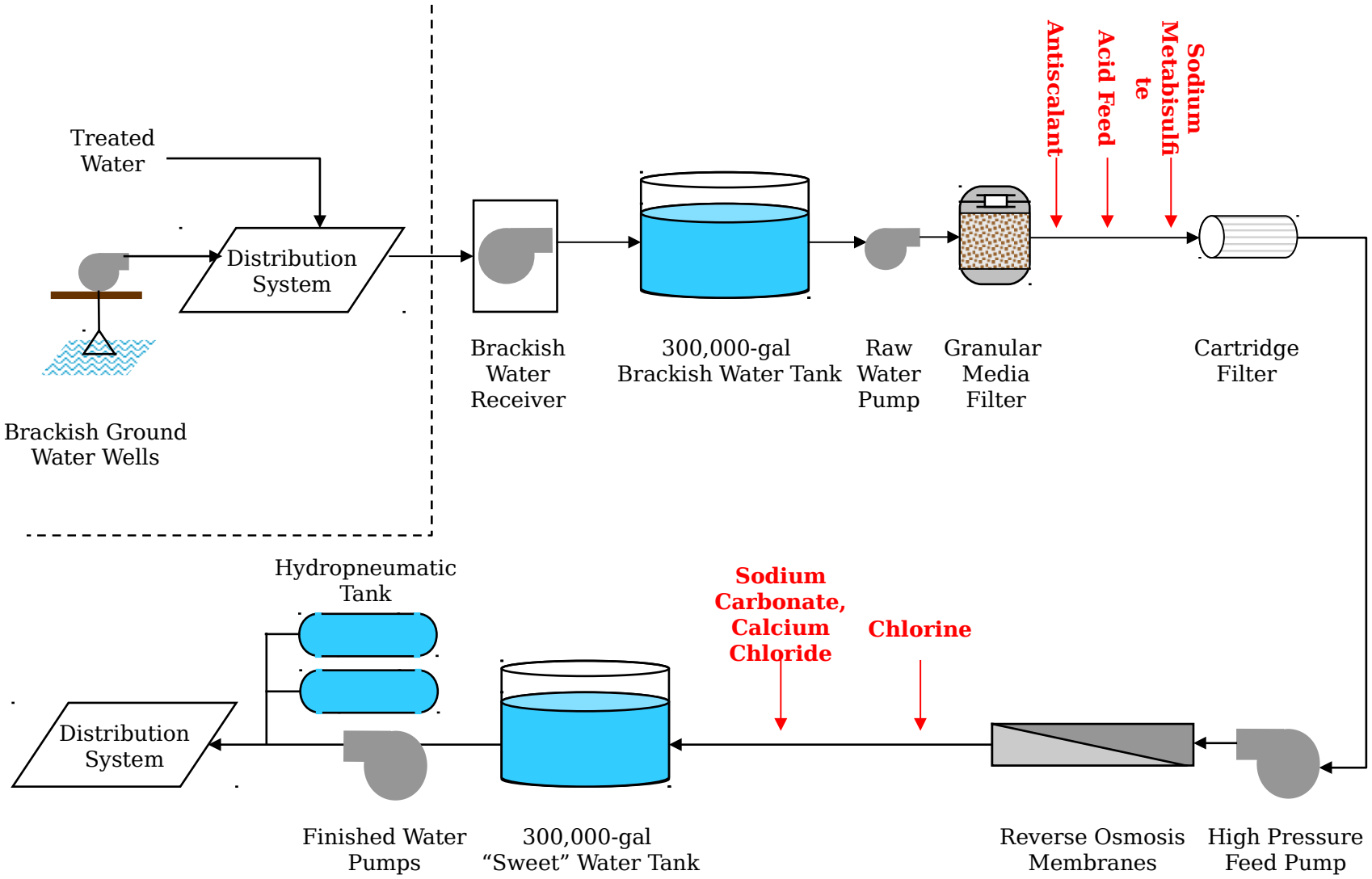
- Design Basis Threat
- Outsiders
- Insiders

ADVERSE CONSEQUENCES

- Public Health
- Disrupt Operations
- Physical Damage
- Reduce Confidence
- Long Term Denial of Water

CRITICAL ASSETS

- Supply
- Treatment
- Storage
- Distribution



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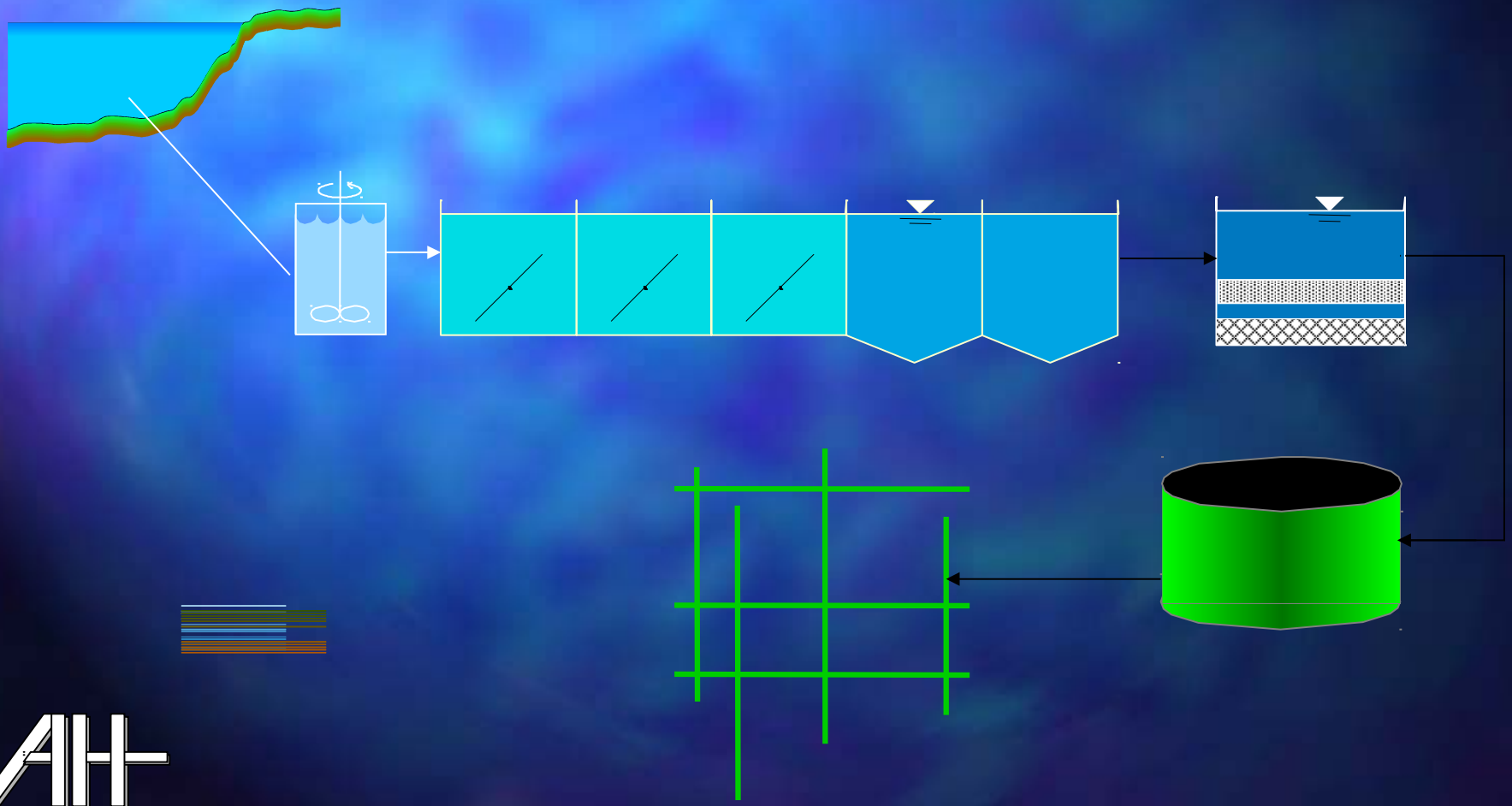
EXISTING WATER SYSTEM SCHEMATIC
Water System Vulnerability Assessment

Figure 2-4

LIKELIHOOD OF MALEVOLENT ACTS

- Regional Issues
- Historical Occurrence
- Real vs Perceived

NAVSTARR



NAVSTARR

- WTP Shutdown
- Water Declared Non-Potable
- Operations Disrupted ~ week

NAVSTARR
Lessons Learned

- Threat is Real
- Not Limited to Large, Well-Organized Groups
- Must Respond Until Real/False Alarm Determined

Lessons Learned

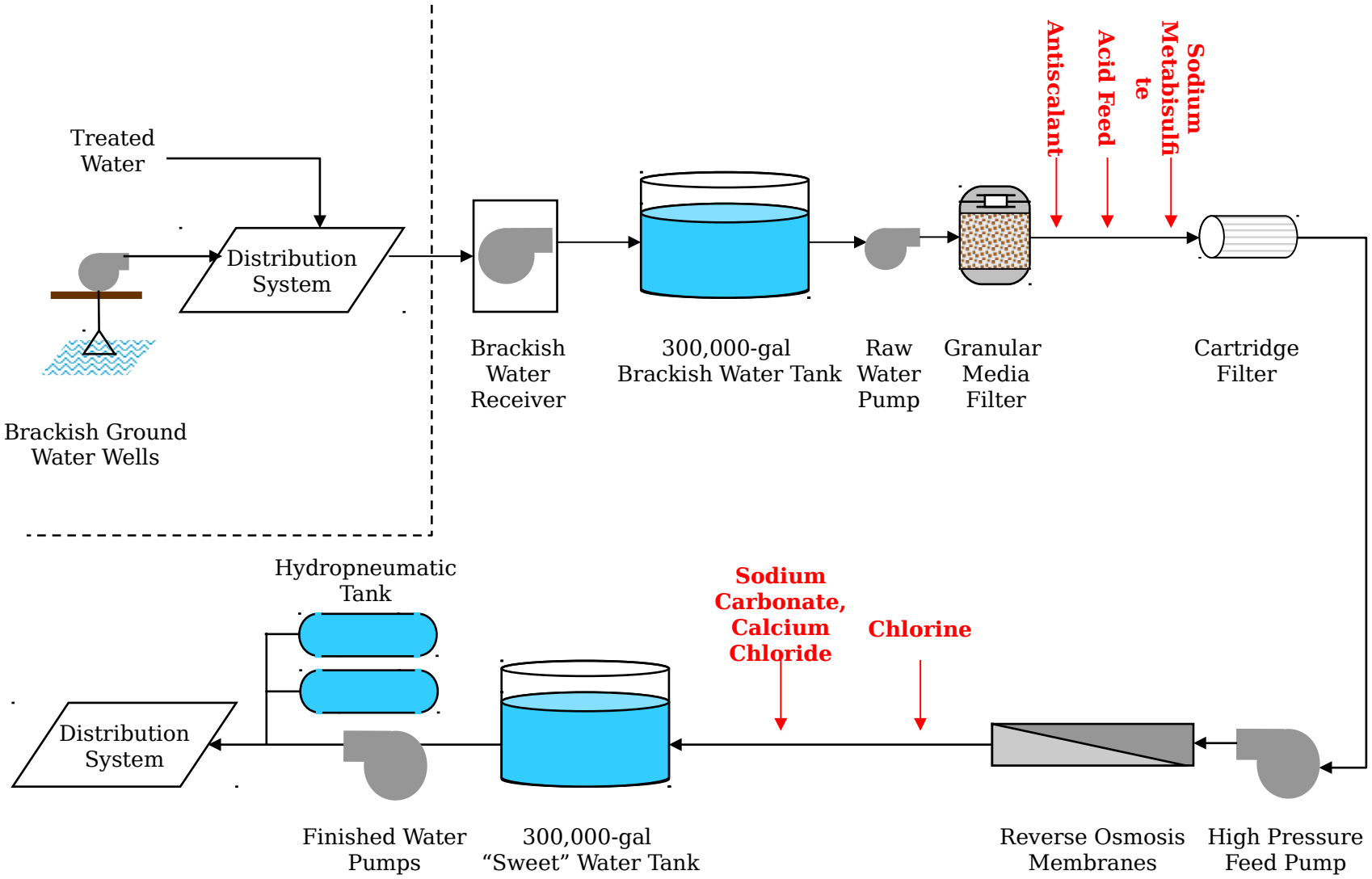
Chemical/Biological WMD:

- Sampling/analytical techniques not avail
- Treatment for many = unknown
- Available = 5+ years

EVALUATE COUNTERMEASURES

- “Lock-the-Front Door”
- Navy/Marines Ahead of Municipal
- Look Beyond the Obvious

ENTRANCE TO THE MOTOR CONTROL CENTER



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EXISTING WATER SYSTEM SCHEMATIC
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Figure 2-4

Cross-Connection Control / Backflow Prevention

Risk Reduction Plan

Immediate:

- Lock doors & gates
- Control/limit access including contractors
- Security patrols

Determine “normal water quality”

Risk Reduction Plan

Short-Term:

- Hydrant locks
- Repair fencing
- Testing for chemical deliveries
- Fix bad “water quality conditions”

Risk Reduction Plan

Long-Term:

- New lighting, alarms & cameras
- New fencing & clear zones
- Continuous water quality monitoring – know what is normal

Emergency Response Planning

Key Elements:

- Threat evaluation
- Site characterization
- Response
- Recovery

Emergency Response Planning

Tier 1 Plans:

- Threat evaluation plan
- Preliminary site characterization
- Comprehensive site characterization
- Notification
- Equipment loss

Emergency Response Planning

Tier 2 Plans:

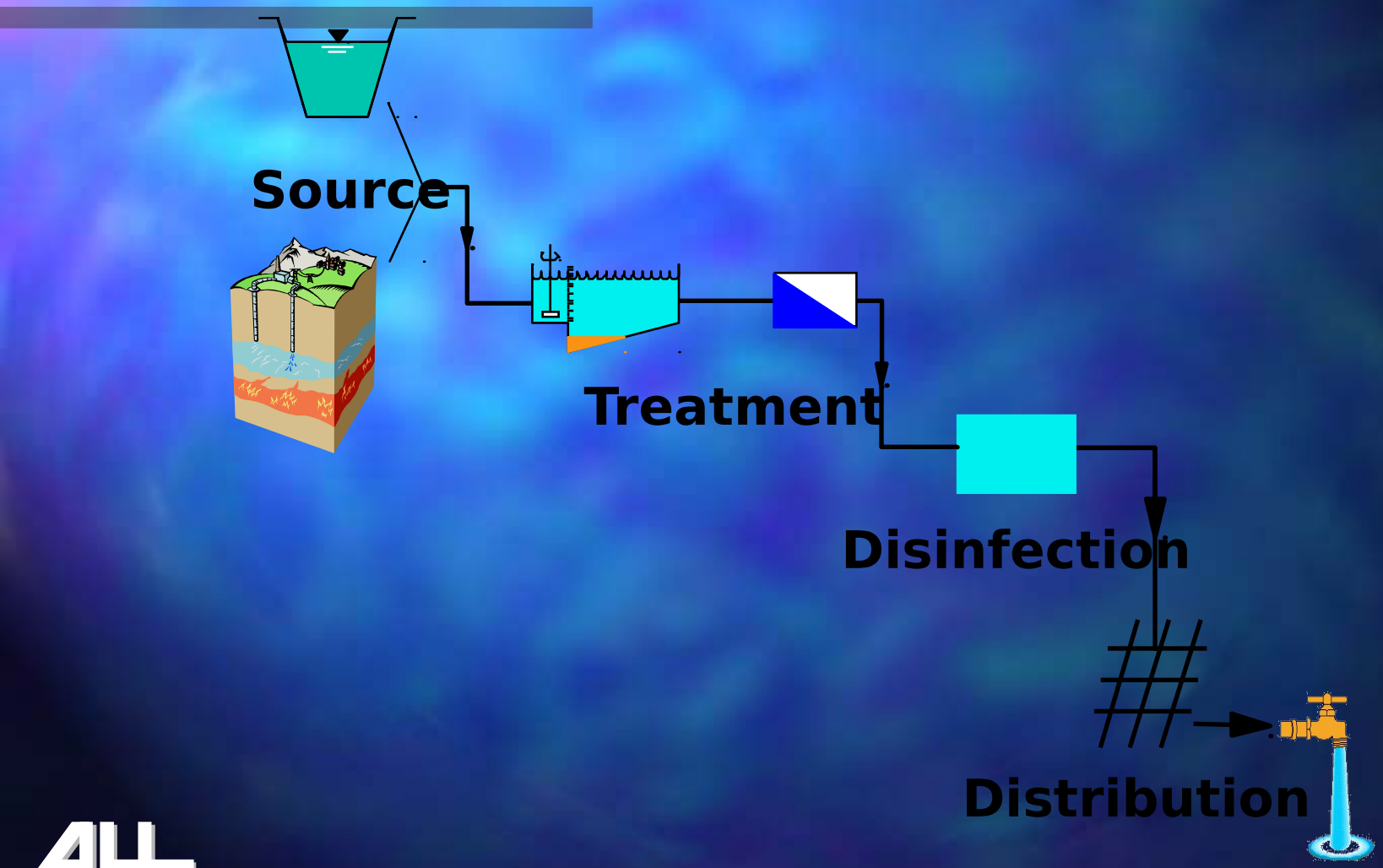
- Valve isolation plan
- Flushing plan
- Water conservation plan
- Alternative water supply plan

Emergency Response Planning

Know

- What you own
- How it operates
- Where it is located
- What is normal water quality

Survey Water System



Instrumentation

1. Calibration
2. Maintenance
3. Is it Real? 50% Yes & 50% No

Online and Benchtop pH Meters

Portable Colorimeter for Disinfectant Residual Monitoring

Distribution System survey:

- Dead Ends
- Tanks
- Oversized Pipes
- Artificial Dead Ends
- Cast Iron Pipe
- Low Residual
- High HPCs

Sins of the Past

- Debris
- Biofilm
- Corrosion Products
- Tuberculation

Beyond Hope

Distribution System Survey

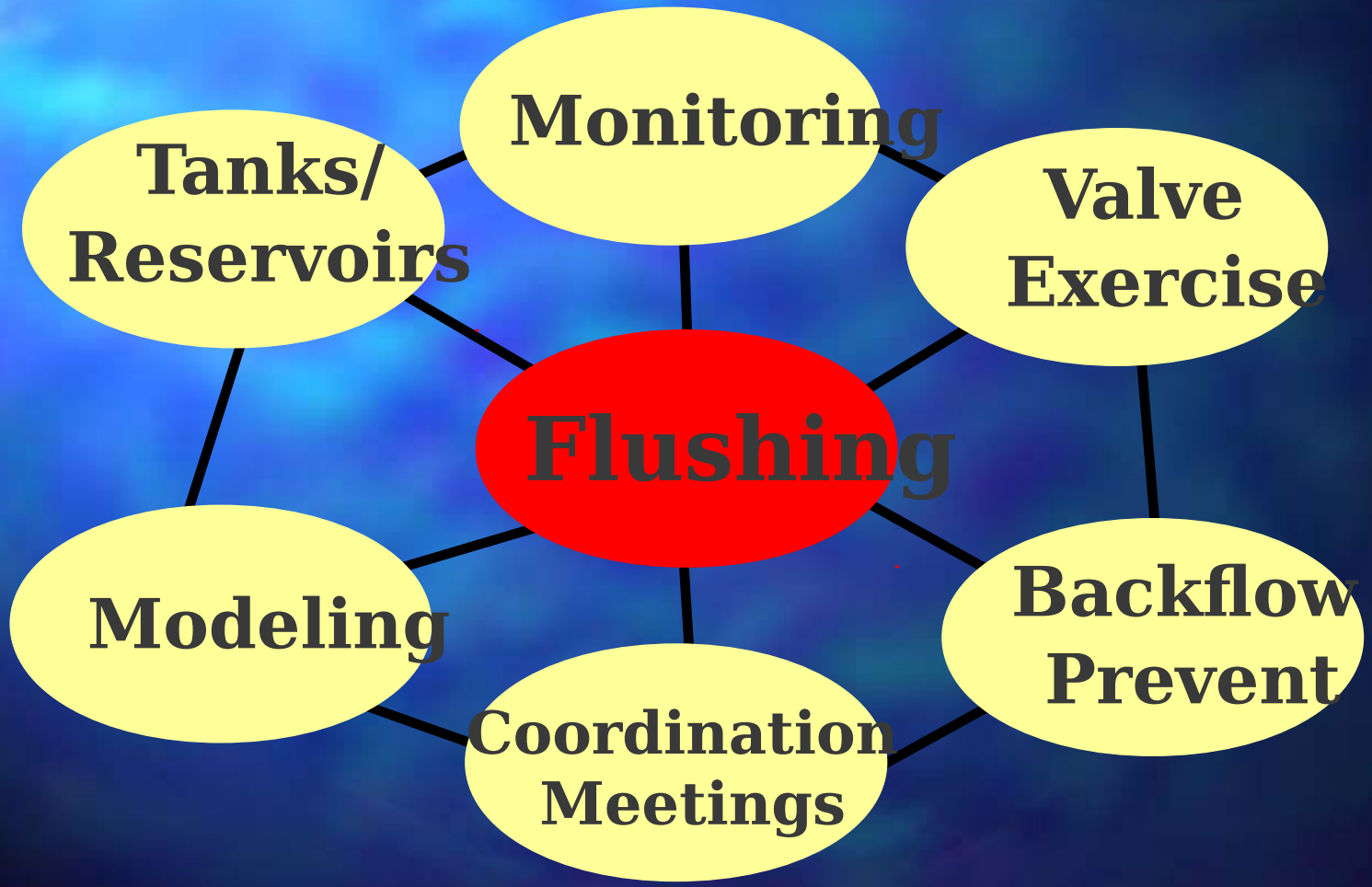
- Accurate maps of the system
  - valve locations, line sizes, etc.
  - map must be accessible

Locate and Exercise Valves

Locate & Exercise Valves

- Closed Valves = Artificial Dead Ends
- Typical System = 5 – 10 % Closed
- Worst Systems = 25 % Closed

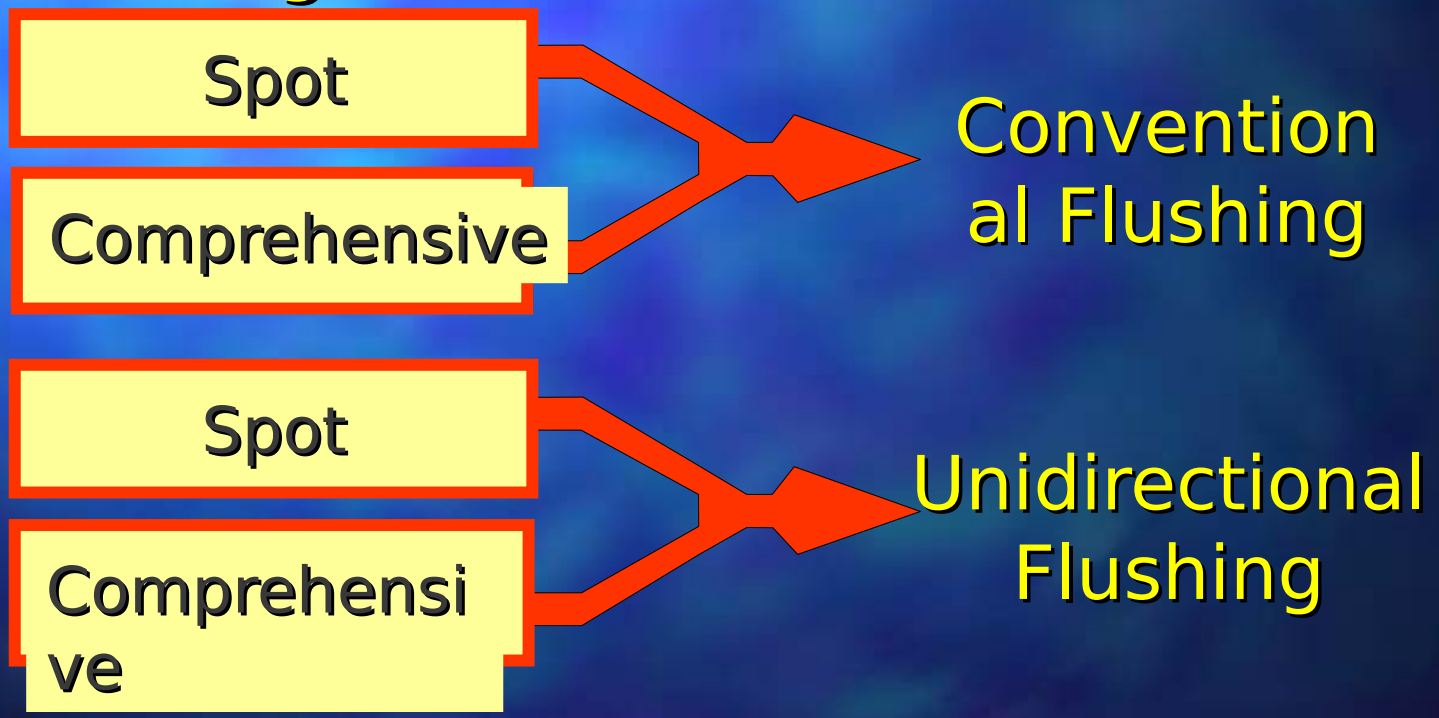
Distribution Systems Operations Plan



Flushing

Types of Flushing

Two Broad Categories:



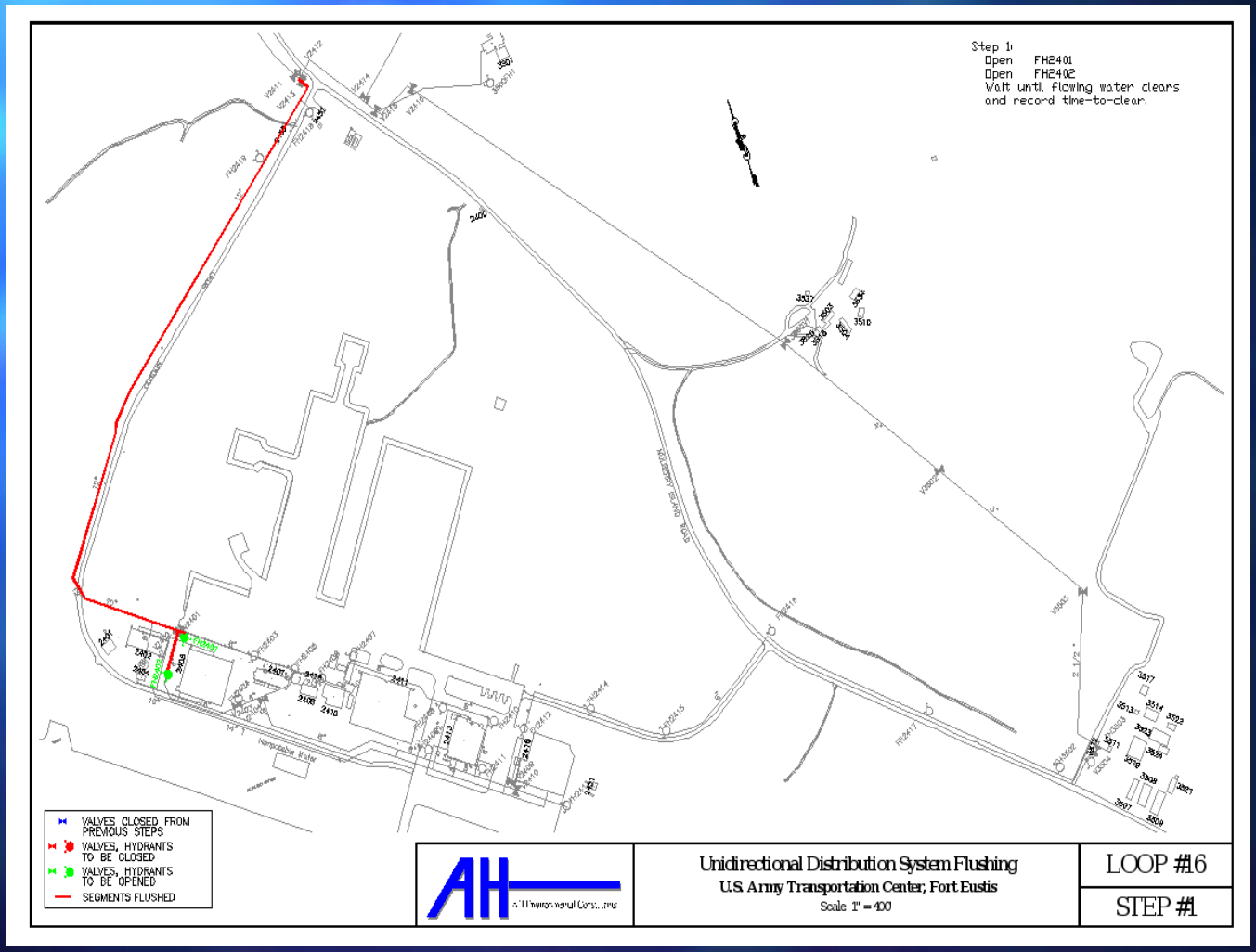
Conventional Flushing

- Open Fire Hydrant Randomly
- No Defined Plan
- No Valve Isolation

Unidirectional Flushing

- Closing Appropriate Valves to Allow for Isolation of Individual Loops
- Open and Close Fire Hydrants in a Sequential and Organized Manner
- Attain a Minimum Velocity of 6 ft/sec

Unidirectional Flushing Program



Blowoffs Work Best to Keep Residual Up

BARRIERS

- Not Understanding System
- Age of System
- Communications (Kingdoms)
- O & M $ Scarce